

After about twelve pages of instructions and examples on the use of permanganate, the student is still told to weigh out so much ferrous salt, make up to so much, &c.; little room is left for the student to think and find out for himself.

After the idea of "normal solution" has been once grasped, many of the directions might be left out. One somewhat objectionable point noted is the direction to weigh out a certain definite quantity of a substance, say 5.3 grams. This is not an easy matter for beginners. It is better to take a weighed quantity and make up solution to the desired strength by addition of the calculated proportion of water.

The ground covered ranges from acid and alkali through permanganate to silver and thiosulphate, preceded by a good description of the use of the burette, &c. The book will no doubt be useful, especially with large classes where the instructor is not able to get rapidly around to the students.

The preface of Mr. Candy's book informs us that the methods and processes of analysis and synthesis have been chosen to meet the requirements of students preparing for parts i. and ii. of the preliminary scientific examination in the University of London and the first examination of the joint board. After a sensible introduction, chapters follow on the identification of bases and acids, methods of separation and tests of purity, and a very useful chapter on preparations. In the latter section are included examples of preparations of mineral salts, acids, esters, alcohol derivatives, &c. The processes of taking a melting point and a boiling point might have been illustrated by a sketch. The preparation method for aldehyde is somewhat dangerous in inexperienced hands. It is safer to drop alcohol, very slowly, into the warm bichromate mixture and distil off the aldehyde as fast as formed. Some short chapters on equivalent and volumetric operations complete the book. The matter is clearly expressed, and the book will be useful for the class of students for whom it is intended.

The first forty-two pages of Mr. Whiteley's book deal with physical changes and physical properties. The book is rather freely illustrated by diagrams of apparatus, and the descriptions and explanations are generally quite clear, full, and understandable. It is designed for the use of those studying elementary chemistry on the lines of the Board of Education syllabus. The purely chemical sections include air, water, common salt, chemical theories, compounds of nitrogen, carbon and sulphur. There are appendices on solubilities of salts, questions and answers to calculations. The book should be very useful, especially to students unable to attend courses of experimental teaching or lectures.

The volume by Messrs. Wilson and Hedley is intended as a school course for beginners. It is entitled "Elementary Chemistry," but a large part of the book is concerned with necessary matters of elementary physics, such as measuring, length, areas, volume, the thermometer, density, solution, evaporation and boiling, Boyle's law, &c. The book is simply and clearly written, and illustrated by useful

diagrams. Strictly speaking, there is no chemistry in the book, but we think all boys intending to commence that subject would benefit exceedingly by working through the excellent course here given.

The plan of instruction set forth by Messrs. Martin and Jones is to perform some experiments on a given substance such as mixing "sal ammoniac with quicklime and heating in a test tube." The inquiring student is then required to write out an account of what he notices, and to compare the results with those obtained when one of the substances is heated alone. Commenced with moderately young students who have not the bogey of an examination paper, or a particular syllabus, throwing a baleful shadow over them, this plan should produce excellent results. The book could scarcely be used to full advantage by students working alone, but with a sympathetic teacher at hand to fill in necessary explanations we think the volume a valuable addition to the host of books already available.

W. R. H.

CERTAIN MODERN VIEWS ON PATHOLOGY

Introduction à la Pathologie générale. By M. Félix le Dantec. Pp. x+504. (Paris: Félix Alcan, 1906.) Price 15 francs.

IN this work the author has grouped together a large and heterogeneous mass of information and speculation, always interesting and always fascinating. The first line of his introductory remarks leads us from the tubercle bacillus to the Milky Way, from the infinitely small to the immeasurably large, and we are soon assured that everything that exists in this formidable interval of space can be subject to investigation, provided it, in any way, can influence us. This promise holds good for everything, from an earthquake on the satellite of Sirius to an analogous occurrence in the interior of an electron; and so on, until after forty pages of pleasant reading we learn that the object of the book is principally to support the views of M. Bordet "and some others" as to the question of immunity. The theories of Ehrlich and his followers give a purely chemical interpretation of the facts of immunity, and are unsatisfactory inasmuch as they confound colloidal changes with chemical changes, properly so called. Ehrlich's views, he says, threaten to become to general pathology what Weismann's have been to biology.

"It is always dangerous to give names to things which do not exist—this is to create entities, of which it will afterwards be found extremely difficult to disembarass oneself."

The author divides his book into two great sections. In the first he desires to advance slowly, to return frequently to the same subjects, so as not to come into too violent collision with the habit of thought of those who have for a long time been familiarised with the language of chemistry; also to give a short account of such of the properties of colloids as may be of interest to the biologist, and to sketch the main lines of the physical theory of serotherapy. Thus he leads the reader to the "notion" of the three heredities, chemical, physical, and symbiotic heredity. The

first part concludes with certain considerations as to the influence of radiations on the equilibrium of living substances.

In the second division of the work the author proceeds to render more precise the language prepared in the first part of his study. He reviews the more important types of infection, and particularly considers intracellular parasitism and symbiosis; then he passes on to the phagocytic studies of M. Metchnikoff, and uses a language different from the vitalistic expressions of the great Russian *savant*. Next comes the considerations of the comportment of the living organism towards injections of dead colloids, thus leading up to the study of infection proper, *i.e.* disease due to living micro-organisms. The above abstracts will suffice to show the aim of the author's book, and chiefly he desires to use "*the language of equilibrium*," language borrowed from physical chemistry. He holds the law of Le Châtelier valid for the modification which an organism undergoes when it triumphs over infection. "The modification produced in a system of bodies in a state of equilibrium by a variation of one of the factors in the equilibrium is of such a nature that it tends to oppose itself to the variation that determines it." His position is even more clearly defined on p. 184, where he says that he wishes to show that if the immunities that result from the resistance of organisms to infection resemble the phenomena of physical chemistry, the resemblance is exclusively on the physical side. He finds that questions on immunity and serotherapy are discussed in the language of chemistry, even by those investigators who do not accept the theories of Ehrlich—therefore the very words used are filled with unjustifiable hypotheses, and give an inflexible interpretation to phenomena. For example, the partisans of the chemical theory of serums admit the existence of two definite and complementary substances, "cytase" and "fixative," the former thermolabile, the latter thermostable, and these thermic relations, according to M. le Dantec, suggest that these substances—even if chemically definite bodies—act in virtue of their *physical* character rather than in accordance with their *chemical* structure.

The phenomena of bacteriolysis receive at the hands of Ehrlich a purely chemical interpretation; M. le Dantec deliberately states that the chief fault in Ehrlich's theory is that the serum-producing animal must have an immediate and profound knowledge of chemistry. This can scarcely be seriously meant.

Nowhere does he give a complete account of the views on immunity and toxins held by Ehrlich, nor is this to be looked upon as a fault, inasmuch as those of Ehrlich's opinions that he does consider he regards as entirely untenable. Still, this omission (if such it be) shows that the book will be of little use to a student really needing an introduction to general pathology, however interesting and instructive the work may be to the thoroughly equipped investigator; and to the latter the learned author doubtless addresses himself. First and foremost he is a biologist, and, moreover, is imbued with the belief that

pathology is capable of throwing a flood of light on biological questions.

Many pages of the work remind us of the author's well known papers in the *Annals of the Pasteur Institute*, and these pages will be read by many with reminiscent pleasure.

Nowhere is the author more interesting and lucid than in his discussion of Mendelian or discontinuous heredity; his quotations are apt and instructive; his own remarks carry with them the imprint of careful study and original thought. In this connection he replaces the "*representative particles*" of Darwin and Weismann by the Pasteurian word "*microbe*"—meaning thereby *particles productive of diatheses*—and claims that by so doing he loses nothing in the narration of the facts, while gaining the advantage of placing the diatheses (characters of Mendelian heredity) apart from the characters of heredity properly so-called.

The book is well worth careful reading, and the author is to be congratulated on a work which will challenge the attention of the more advanced students of pathology.

WM. ST. C. SYMMERS.

OUR BOOK SHELF.

Die optischen Instrumente. By Dr. Moritz von Rohr. Pp. v+130. (Leipzig: B. G. Teubner, 1906.)

THE aim of this little book, one of a series dealing popularly with various subjects of scientific or general interest, is to give a simple account of the development and modern theory of optical instruments, and to make clear to readers possessing no special technical knowledge the main features of their optical construction. The treatment is largely based on the work of Abbe; and in the introductory chapters, which deal with the general principles governing the formation of optical images and the consequences dependent on the characteristics of the eye, special attention is given to the question of aperture and the limits of the image-forming pencils, and to the manner in which the perspective of a picture may be modified in the image. In the application of these considerations to the photographic lens, the microscope, and the telescope, there is some novelty and interest. In other respects a clear and concise account is given of the main properties and aberrations of the different instruments, whether for objective or subjective use, with some brief historical notes. The section on the photographic lens is followed by useful particulars as to enlarging and projection apparatus; the description of the microscope includes a short explanation of Abbe's theory of microscopic vision, of the relation of "numerical aperture" to resolving power, and of the sine law, and even admits of reference to the possibilities of photomicrography with ultra-violet light. To the description of the ordinary forms of telescope are added some notes on the prism binocular as constructed by the Zeiss firm. The diagrams and illustrations are noticeably well drawn and clearly printed.

Second Year Chemistry, a Handbook for Laboratory and Class Work. By Prof. Edward Hart. Pp. vi+165. (Easton, Pa.: The Chemical Publishing Co., 1905.) Price 1.25 dollars.

THE plan of this book is to begin, after a few theoretical generalities, with some careful quantitative determinations. Thereupon follow qualitative analysis, chemical arithmetic, and, finally, more quanti-